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o. 5 per cent solution of sodium nitrate, they suffer little or no injury. Pea seedlings die in 2 days in a o. 5 per cent of sodium oxalate, but are still uninjured in an equally strong solution of sodium acetate.

In *Spirogyra* the first structure to show the effect is the nucleus, which contracts and becomes lens-shaped. A little later the chloroplasts begin to contract. LOEW finds that the effect is not due to acidity, since o.005 per cent of oxalic acid is more injurious than o.01 per cent of citric acid, and o.0001 per cent more injurious than o.001 per cent of tartaric acid.

LOEW concludes that the injurious effect of the oxalates is due to the extraction of calcium from the nucleoproteins, chromatin, and plastin, and its replacement by potassium or some other element, and their bringing about a change in the imbibing power of the different parts of the protoplasm. He thinks that calcium is an essential element in the cells of the higher animals and plants.—J. N. MARTIN.

Sutcliffia.—Miss DE FRAINE¹² has made a painstaking investigation, by means of the well known wax plate method of modelling, of the vascular system of *Sutcliffia*, a new genus of the Medulloseae established by SCOTT. Unfortunately the specimen is rather badly dilapidated and for that reason a certain reserve is necessary in interpretation. The vascular system as described by Miss DE FRAINE consists of a large axial "protostele" (sic!) surrounded by three more or less clearly identifiable "meristoles." In addition to these are a number of "extrafascicular" bundles. By a process of reasoning which it is difficult to follow, the author identifies the central "protostele" with the ring of bundles in the Cycadales. It would seem to be in accordance with the general principles of vascular anatomy to regard it as a medullary bundle, and the three surrounding strands as corresponding to the cylinder system of bundles, a conclusion rendered extremely probable by the fact that it is with these that the leaf traces become continuous. *Sutcliffia* is considered to be a primitive type regardless of the fact that it has an extremely multifascicular foliar supply. This would appear to be entirely against all established principles of anatomy. It is gratifying to find that English authors are gradually coming around to the standpoint in regard to the affinities of the Cycadales, namely as rather with the Medulloseae than the Lyginodendreae, which has been held in continental Europe and this country for more than a decade.—E. C. JEFFREY.

Cause of leaf fall.—In a limited series of experiments conducted with detached twigs of various deciduous trees placed in water in a saturated atmosphere, VARGA¹³ has attempted to establish the relationship between this

¹² DE FRAINE, E., On the structure and affinities of *Sutcliffia*, in the light of a newly discovered specimen. Ann. Botany **26**: 1031-1066. figs. 19. pls. 91, 92. 1912.

¹³ VARGA, OSKAR, Beiträge zur Kenntnis der Beziehungen des Lichtes und Temperatur zum Laubfall. Oesterr. Bot. Zeitschr. **61**: 74-88. 1911.

phenomenon and the processes of transpiration and photosynthesis influenced by various conditions of light and temperature. These experiments seem to show that (1) any decided checking of photosynthesis either from light conditions or from a deficiency of carbon dioxide brings about leaf fall; (2) any lowering of transpiration also produces defoliation, but less rapidly than decreased photosynthesis; (3) variation in the intensity and quality of the light has no direct specific action upon leaf fall; and (4) lower temperatures are efficient in causing leaf fall through decreased photosynthesis and transpiration only within limits which permit the activities involved in the development of the absciss layer; below these limits the leaves die, but cling rather persistently to the twigs. It is to be regretted that the experiments were so limited and hence so few data were accumulated in support of the conclusions reached.—GEO. D. FULLER.

The Forest Club Annual.—Among the publications which tend to promote an intelligent interest in the problems of forestry this annual¹⁴ from the University of Nebraska is worthy of something more than passing notice. Among the articles it contains are "Grazing investigations on our national forests," by A. W. SAMPSON, and "Effects of forests upon run-off in the Rockies," by R. D. GARVER. Both present data that are important from the ecological as well as the economic point of view. The same may be said of "Notes on winter-killing of forest trees," by C. P. HARTLEY, which shows the need of careful investigation of the various physical factors involved before any adequate explanation of the action of winter conditions upon forest trees may be obtained. The other problems discussed include forest conditions in parts of Nebraska and Arkansas, forest roads, trees suitable for streets and parks, and some phases of lumber manufacture.—GEO. D. FULLER.

Fairy ring fungi.—These well known fungi are found by BAYLISS¹⁵ to be parasitic upon the roots of grass. They soon kill the roots by the secretion of some toxic substance. The same or some other secretion is toxic to the fungi themselves, making them unable to grow in the same soil for three years in succession and hence producing the well known development of yearly widening rings. Contrasted with the infected grass, that which lies immediately outside as well as inside the ring is stimulated into better growth by the greater abundance of nitrogenous food made available by the action of the mycelium of the fungi in secreting proteolytic enzymes. The yearly increase in the radii of the rings of *Marasmius oreades* was found to be 6-14 inches.—GEO. D. FULLER.

¹⁴ The forest club annual, vol. 4, pp. 160. University of Nebraska, Lincoln, Neb. 1912.

¹⁵ BAYLISS, JESSIE S., Observations on *Marasmius oreades* and *Clitocybe gigantea* as parasitic fungi. Jour. Econ. Biol. 6:111-132. 1911.